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ON THE DIAGNOSTIC VALUE OF THE PHORIA TEST MADE AT THE START OF THE REFRACTION

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A phoria test made after the manifest refractive error has been corrected is of little practical value. A comparison of phorias manifest, before and after refractive errors are corrected, has some value. For an orthophoria found at the beginning of the examination may not be safely changed to an exophoria by plus lenses; if this occurs, then the plus lenses are too strong. Either they must be reduced until orthophoria again obtains or compensating prisms equal to the produced exophoria must be incorporated in the prescription. The same is true of an esophoria; it may not be increased by plus spheres.

If plus spheres reduce an exophoria, as sometimes happens, then we know we have rendered the patient a valuable service.

Minus lenses that decrease an exophoria are dangerous, and in my opinion must not be prescribed.

If the refractionist will take both distance and near phorias at the beginning of the examination, with the old glasses before the patient's eyes, or without glasses if the patient has never worn them, he can pick up some information that will prove valuable. It will give him a guide as to what his procedure shall be and will greatly reduce the time of the examination period, for we have found that comparison of distance and near phorias often has a specific meaning.

Just about the most important thing to know is whether or not there is a high latent hyperopia. We find that comparison of distance and near phoria tests often gives us a clue.

In young people, a normal condition is orthophoria at distance with 2Δ or 3Δ of exophoria at near. If there is an apparent emmetropia with this, we can be assured that there is from 1 D. to 3 D. of latent hyperopia. But this is usually so well balanced in the convergence-accommodation function that covers it, that it seldom causes distress.

A finding of 1Δ, 2Δ or 3Δ of exophoria at distance, with 2Δ or 3Δ more of exophoria at the near point, either in young or middle aged people, with either apparent emmetropia or a manifest hyperopia, need give us no concern in itself. But we have this warning, that when we have finally written our prescription, we must be sure there is no more exophoria, for this type of person very readily accepts more plus monocularly than they will carry binocularly.

But given this same low exophoria at distance with a very high exophoria at near (say 4Δ to 10Δ more exophoria at near than at distance) we shall usually find that all the plus we can crowd on will be very gratefully accepted. However, there is one type showing this combination of exophorias that do not need plus lenses, in fact, generally need no lenses at all. That is the youth of 16 to 20, complaining of eye discomfort at near work, whose trouble proceeds from disfunction of the thyroid and pituitary glands. To be sure, in these cases, the amount of the latent hyperopia must be ascertained before anything in the way of glasses or prism exercises is undertaken. If there is little latent error, these youths will not be aided by anything the refractionist can do, proper treatment by an endocrinologist will quickly relieve them of their eyestrain. With this single exception, we will find that practically all cases showing low exophoria at distance with high exophoria at near need plus lenses. However, the reader will note that in the preceding paragraph we specified young or middle aged people. High exophorias in people of advanced age mean low bodily tonicity, the cause is not in refractive error or extrinsic muscle fault.

In middle aged patients, from 35 to 50, esophoria at distance with high exophoria at near means, invariably, high latent hyperopia. Get out this latent error, make it manifest and correctible, correct it in full. Base-in prisms in the glasses and base in exercises will be needed. For this type of person will not accept "fogging lenses," nor will they readily change their habit of strong convergence-accommodation effort. They need the inhibition of the base-in prisms.

Usually these persons show a low adduction reserve. It is a mistake to give them base-out prism exercises. You may give temporary relief, for your exercises will start a flow of tonicity, but in a few weeks they will be back with complaint of the old trouble, and you will say, "Return of convergence-insufficiency." Nothing, in my belief, more ridiculous appeared among the many speculative theories of the last century than this fable of "Return of convergence-insufficiency." Give these people Kratometer treatments with base-in

prisms, get on the plus, and you will find that the adduction has automatically increased. This idea of convergence-insufficiency coming back was based on the fallacious theory of adduction "reserves." High adduction, high abduction, high vertical ductions, mean freedom from tensions. They do not mean "muscular strength." It is quite true that high ductions usually mean comfort, but they do not always mean comfort. They spell comfort only when there is free dissociation of the convergence from the convergence-accommodation, when the central system is so free from inhibitions and stresses that the two functions are readily dissociated when need arises.

So in these middle-aged patients with esophoria or orthophoria at distance with high exophoria at near, waste no time thinking about their "adduction," but get busy rooting out and correcting the latent hyperopia. Even if you find some hyperopia along with these esophorias at distance and high exophorias at near, forget about the hyperphoria, for it will disappear when you have corrected in full the hyperopia.

Too little attention has been given to the association of the superior obliques in the act of convergence-accommodation. More and more the evidence indicates that if there is any question of superiority, or of greater relative importance, as to the superior obliques or the internal recti, in the act of convergence-accommodation, it is the superior obliques that are the chief. Hence, those false hyperphorias and cyclophorias that are so common in association with latent hyperopia, that disappear when the cause is removed by the prescription of plus spheres to correct the full latent hyperopia. For then the cause is removed. No longer is it necessary to make the tremendous effort required in compensating the structural error to get clear vision.

Regardless of age, whenever the exophoria or esophoria or orthophoria at distance and near are the same, latent hyperopia is indicated. The patient must have plus spheres for close work. And do not rest content to give the young person only that amount of plus with which he can see the 20/XX letters. Take care of his near work requirements and don't be afraid of giving this type of young person bifocals. I know most practitioners have been educated to prescribe bifocals for presbyopes only. Prescribe for the young people the corrections they need for close work without strain. It isn't a question of "lack of accommodation," it is a question of too much convergence-accommodation. Give the plus for near work and inhibit this excessive effort. The clue is in the comparison of near and distance phoria tests as a preliminary step in the examination routine. Orthophoria at both distance or near, or the same amount of exophoria at distance and near, or the same amount of esophoria at distance and near, all indicate that the person needs a repressive lens at the near work. Of the three types mentioned in the last sentence, the third one is

the hardest to conquer. And in this type there is an occasional exception to the rule of plus lenses for near work.

There is an esophoria not connected with nor due to latent hyperopia. In this you will find sometimes a little more esophoria at near than at distance, sometimes a little less, sometimes the same. This esophoria is most frequent in young women, is psychopathic, generally, is seldom helped by plus spheres. The only way to distinguish it is to find immediately the amount of latent hyperopia.

Orthophoria at distance with low esophoria at near, esophoria at distance with a little more (2^{Δ} or 4^{Δ} more) at near, exophoria at distance with less exophoria at near, all mean latent hyperopia. There is very frequently an hyperopia at near, with more, or with a different amount (usually less) at distance. This hyperphoria is spurious. Go after the latent hyperopia and the troubles will smooth themselves out.

A very high esophoria at near, 10^{Δ} or 15^{Δ}, with orthophoria or low esophoria or exophoria at distance, means a disturbance in the central nervous system and should be referred to a competent neurologist. The optometrist should not attempt to do anything with such a case.

It takes but a couple of minutes to make these phoria tests and this data gives a clue to what the next step ought to be. It will save you far more time than it takes to make the tests, leaving you that much time to spend at something else. These tests will also save you many a recorrection, and add certainty to your methods. For comfortable prescriptions that relieve eye strain are what your patient comes to you for, the delivery of such corrections builds up your prestige and your income.

We have thought of the phorias as being associated with "muscle troubles." They have seemed so complicated, so uncertain in their interpretation, that we have become rather fearful of them. But in fact, there is nothing complicated or difficult to understand about a phoria test, *IF* it is made at the beginning of an examination. Many have found that it means nothing after the refraction is concluded, so have ceased to make the test. I have far more respect for the intelligence of the man who found that a phoria test is valueless if made as the text books prescribe, as a "muscle test"; and so ceased to make phoria tests, than I have for him who goes on blindly making the tests because he was told he ought to, but does not know what to do with the information after he gets it. The information is of little account, as we have said, if it is obtained after all the work is done, but it is of immense value if obtained at the proper time, *i. e.*, at the start of the refraction and its diagnostic value put to use in the formula prescribed.

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REPORT OF A CASE OF AMBLYOPIA AND A CASE OF SQUINT SUCCESSFULLY TREATED BY MEANS OF DR. WELLS' TECHNIQUE

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I have one case on file which I think is most interesting and is an evidence of what can be accomplished with the Wells-DeZeng Phorometer and Amblyoscope.

The patient happened to be a lad of twelve years going to school and while reading always held his book at approximately six inches from his eyes. The vision without lenses was 20/100 O.U. Examination disclosed 1.50 diopters of hyperopia, O.D. and 1.25 of hyperopia, O.S. At the time of the first examination with this prescription before the eyes no improvement in vision could be obtained. A study of the form and color fields was made and the data obtained showed normalcy. A tonicity test was made and it was found that the patient had 2 prism diopters of esophoria for distance and 7 prism diopters of esophoria at 13 inches. Scarcely any prism power base-in could be rotated before the eyes without causing diplopia. The case, being one of amblyopia, the patient was started immediately on stereoscopic and amblyoscopic treatment the vision had improved to 20/65 in both eyes. After eleven treatments the vision was 20/40 O.U. and at the end of the sixteenth treatment the vision was back to normal 20/20 O.U. At this point the muscles were orthophoric at distance and near. The distance ductions showed O.D. add 30 P.D. Abd. 6 P.D. O.S., Add. 22 P.D. Abd. 6 P.D. The above results were accomplished in less than three months.

I have also on record a case of alternating squint (convergent) which I took on as more or less of an experiment, but the treatments helped considerably. In this case of a child age 7 years the vision in both eyes was normal and examination disclosed 1.00 diopter of hyperopia, O.D. and .87 in O.S. With the stereoscopic cards especially the B3 card used to determine the relative position of the visual line, the number 2 on the black line was separated about an inch to the right of the red line. In order to fuse the pumpkins 12 degrees of prism base-out was necessary. By the thirteenth treatment the pumpkins could be fused without any prism power before the eyes

and with the B3 card the (G) on the red line crossed the black line between three and four.

At the end of twenty-four treatments the eyes could overcome diplopia with the H11 card with ninety-five degrees prism base-in. During these exercises the eyes have shown a marked improvement in that the alternating squint has been reduced considerably and the last time I saw the patient the squint was noticeable only very rarely.

These cases make me certain that splendid results can be obtained by systematic stimulation of the nerve centers and the training of a better fusional power and I believe the Wellsworth Stereoscopic Cards together with the Stereo-Phorometer are a most valuable asset to the modern optometrist, as they enable him to develop a technic to treat these cases.

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STEREOSCOPIC TREATMENT

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Stereoscopic treatment of binocular imbalance embodies two very important factors:

1. The diagnosis of the nature of the binocular imbalance.
2. The method of treatment.

Offhand, it would appear that stereoscopic treatment is practically the same in all cases. It is far from such.

In the foregoing paragraph the writer mentions the making of the diagnosis of the exact nature of the binocular imbalance. What is meant by this is whether an existing excess-exophoria is a true convergence insufficiency or an exhaustion-exophoria; whether or not base-out or base in treatments are to be given. The differentiation has been mentioned previously by Peckham[1] and by the writer[2] in the previous numbers of this Journal and other technical papers. Esophoria that is due to the compensation of hyperopia or hyperopic astigmia also comes under the binocular imbalances the writer has reference to. It is assumed that imbalances of pathologic or systemic origin are not to be considered in this article. Vertical phorias of non-pathologic origin will be discussed further on.

Before discussing the technique of stereoscopic treatment, it may be well to mention right here that the ordinary stereoscope is worse than useless. Unless access to a refractor head, phoropter, kratometer or any such device can be had, stereoscopic training cannot be properly executed. Assuming that the type of imbalance has been properly diagnosed, and that the refractive error if any has been found and corrected, we may now continue with the execution of the treatments.

Suppose the case presents a true convergence insufficiency, manifesting 3$^{\Delta}$ exophoria at 6 meters and 18$^{\Delta}$ exophoria at 35 centimeters, age 25 years, and in good sound health. The procedure would be: Correct the refractive error if any and proceed as follows—Use the F—L or any similar card, turning in sufficient base-out prism until

the "E" is seen. In cases of high convergenal insufficiency, no prism base-out will be needed or in extreme cases base-in prism may have to be turned in until the "E" is fused. But do not add a + 3.00 D. Sph., for the 35 centimeter distance. This is just where so many go wrong. This is why so many do not have success with treatment cases. We do not want to suppress any function in this particular case, but we do want to stimulate co-ordination between accommodation and convergence. Now proceed with your prism base-out treatments, using only 1Δ increases. Peckham[3] has stressed the break-shock method so often that there is no need to make any further mention of it here. Let me repeat again—all that I wish to stress is that the + 3.00 D. Sph., compensating lens for the 33 or 35 centimeter distance should be left out. Enough has already been said about prism treatments. It may be added that in cases of presbyopia, the reading addition should be placed before the eyes.

Those cases of exhaustion exophoria and esophoria may both be treated in the following manner: Instead of using an F—L card, a single target should be used, such as a red stamp. Place the distance correction before the eyes (reading addition to be placed before the eyes in cases of presbyopia or those cases where temporary bifocals are prescribed including the amount of prism used in the correction, if any) then add the difference between the presbyopic addition and the + 3.00 D. Sph., for the working distance of 33 or 35 centimeters. If the + 3.00 D. Sph. blurs the target too much, cut down the compensation lens to a + 2.75 D. Sph., or a + 2.50 D. Sph. Now the plus compensating lens is to suppress accommodation so that convergence assistive impulses will not be called into play. Please bear this point in mind, here the extra + 2.50 D. Sph. or + 3.00 D. Sph. assists the patient to suppress accommodation, thereby allowing the convergence to relax still more. Now proceed with prism base-in treatment, using the break-shock method. Do not exceed 1Δ at each step.

As soon as prism base-in is added, the target will clear up, and appear to enlarge and recede as the power of the prism base-in is increased; as the power of the prism of the base in is reduced, the target will appear to advance and decrease in size. This is due to a psychologic reflex. Prism base-in relaxes convergence. As we relax convergence the mind interprets the objects of fixation as being further away. Prism base-in makes the fixation target appear larger because the mind interprets the object as being further away. We know from experience that a large object need not be brought up closely for observation, hence as soon as convergence is relaxed we automatically interpret the fixation target as being larger than it really is. The exact opposite is true in base-out treatments. With the increase of prism out, the fixation target advances and appears to decrease considerably in size.

If there is a vertical phoria of considerable degree, it would be best to give treatments with the prism base-in in the direction of the

deviation. For instance, in right hyperphoria, exercises should be given O. D. base up, O. S. base down.

If one eye is amblyopic, place smoked lenses over the better eye until the vision in each eye is about the same, or, better still, use the photometric glass of Fischer.[4] If the amblyopia is such that simultaneous fixation is impossible, then the vision in the amblyopic eye must be built up[5] before the treatments can be given.

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OCULAR PSYCHOMETRY

Being an Outline of the Fundamental Principles Governing the Control of the Ocular Muscles.

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CHAPTER 5

This chapter is not intended to be a history of Oculo-Calisthenics. In order to conserve space, all methods that have been and are now employed in attempts to relieve Asthenopia, Asthenic disturbances and the various discomforts attending anomalies of the ocular muscles are herein grouped under the following broad classifications and discussed in the order given:

1—Occlusion
2—Prisms
3—Surgery
4—"Duction" Building
5—"Vergence" Building
6—Physiologic Training

The first group (Occlusion) is intended to include all measures taken to suppress, supplant, or avoid one or more natural normal functions, which if exercised tends to aggravate the abnormal condition.

Several examples are: "Fogging out" one eye with plus spheres; or ignoring its refractive error in cases of aniso— or antimetropia. Prescribing "frosted" lens for the squinting eye in cases of Heterotropia where the diplopia-sense is retained. "Crowding on the plus" until vision is blurred in cases of Esophoria or Esotropia. The use of atropine in both eyes in like cases. The use of cycloplegia (atropine) so that one eye is used for distance and the other for near. The fitting of bifocals prior to presbyopia to avoid accommodation inducing excessive co-vergence.

Obviously the philosophy supporting the above practice is that it is better to have a comfortable usable part than an uncomfortable whole; which is admittedly permissible as a last resort, but not to be considered as tending toward correction of the abnormal conditions the effects of which they seek to avoid. In fact, permanent improvement of the primary difficulty we believe is so rare under such treatment that one is justified in the assumption that improvement, when it occurs, is in spite of, rather than because of the treatment.

The second group (Prisms) includes as well as the prism prescription for continuous use, antagnostic prisms which are generally conceded to be impractical in practice; prisms for reading only; and prism "segments" sometimes employed in cases of antimetropia. There are cases, particularly in aphakia of one eye, when the use of prism "segments" is unquestionably good practice; but inasmuch as resort to prism correction is in most cases a surrender to the existing heterophoria and not an attempt at restoration of natural orthophoria, we therefore believe prism corrections on the whole must be considered only on par with, or as crutches.

Crutches are at times justifiable as a temporary measure in bringing relief to tortured organs. In the strict ocular sense, prism correction as a temporary means of providing and developing "fusion" are to be commended; but the permanent prism correction is rarely justified and it is almost as rarely comfortable and acceptable to the patient. A great many (one may safely say almost all) cases of heterophoria are variable in degree—that is, the amount of the error is subject to variation according to the hour of the day, the patient's physical or mental state and the direction in which both eyes are turned as the patient looks right, left, up or down, far or near.[23] Prisms, however, are of necessity made of inflexible glass. So, not only because they are a poor substitute for a physiologic correction of heterophoria, but also because of the almost infinite complications they invoke, it is indeed fortunate that modern well informed, conscientious and painstaking optometrists must resort to the prism Rx but very, very seldom.

The third group (Surgery) is intended to be broad enough to include; besides cutting and ligating (which are resorted to chiefly for aesthetic reasons only, and therefore do not require discussion herein) those corrective measures involving manipulation of the eyeball with the fingers, "spoons," "massage cups" and other mechanical devices.[24] The philosophy of such methods are based on the assumption that "adhesions" prevent the eyes from enjoying full, effortless rotation; or that the difficulty (including sometimes errors of refraction) is the result of lymphatic disturbances.[25] Unquestionably there are cases in which tendinous adhesions are at least, in part, responsible for heterophoria and heterotropia, and other cases in which ocular lymph pro-

duction, circulation, and drainage should be improved to assure normal conditions, but unfortunately, neither surgical nor manipulative treatments of the eye are complete in themselves. Any disruption or disturbance of the delicate ocular or extra ocular tissue tends to leave the tissue decidedly subnormal in tonicity or natural resilience, so that Oculo-Calisthenics—strictly within the field of Optometric practice—should, we believe, follow all such treatment of the eye, and in the strictest sense, should both precede and follow all forms of ocular surgery.

The fourth group (Duction Building) includes all forms of the so-called "prism exercises," whether with the rotary prism, trial case prisms, the stereoscope, prism bar, or the jump or shock system. This group should even include the Amblyoscope for the principle in all is essentially the same.

The philosophy upon which this technique is founded is, that "fusion is the supreme ruler." It is true that such methods are exceedingly valuable where the purely psychological function, the desire for single *binocular* vision, is subnormal, but it is contrary to common experience as well as our laboratory observations to assume that poor fusion is entirely to blame for *all*—or even in a sense *any* "muscle imbalances."

Fusion is to blame for the *discomforts,* headaches, nervousness, etc., attending heterophoria, certainly; because when there is no fusion, as in constant strabismus, there is no discomfort.

The first step in determining the presence or absence of esophoria, exophoria, hyperophoria, hypophoria or cyclophoria, is to introduce a maddox rod; a maddox double prism; opposed-base prism, or some means of providing complete dissociation, thereby *making fusion impossible!*

We believe it is obvious therefore that *fusion* has nothing to do with the existence of orthophoria, especially when we consider that in the natural development of a normal child "fusion" is the last visual faculty to make an appearance.[26]

The normal function of "fusion" is to interpret the light stimulus of two retinae so that the visual awareness agrees with conception through the sense of touch, etc., and "fusion" is employed to direct *adjustment of the ocular muscles only when some more primitive faculty is other than normal.*

Without fusion's demand for single binocular vision which calls the "duction" powers into action, heterophoria becomes unsightly, but nevertheless a quite comfortable heterotropia. When fusion demands constant use of the "duction" powers, which are never required of normal eyes under normal circumstances, heterotropia becomes more sightly, but less comfortable heterophoria.

"Exercises" and prism training designed to develop fusion; duc-

tion control of the ocular muscles to unnatural extremes for the purpose of "overcoming" or "offsetting" abnormal heterophoria or heterotropia, are as truly substitutes for real, natural orthophoria, as are prism corrections; and we believe not more often permanently acceptable.

"Nature tends toward the normal" so that the super-normal, recently acquired or developed "duction" powers gradually recede to normal, leaving the original imbalance, usually about as they were before training began.

The fifth group ("Vergence" Building) embrace all forms of ocular exercise designed to induce concomitant movement of both eyes in the same direction. Dexter-vergence (both to the right); Sinister-vergence (both to the left); Supra-vergence (both up); Deorsum-vergence (both down); and Convergence(both inward).

It would also include methods frequently advocated by laymen. The underlying philosophy being that all ocular muscle imbalances, and eye discomforts, (some writers even include errors of refraction) are physical disturbances and deterioration resulting from physiologic disuse or abuse; and that relief and correction follow calisthenical activity regardless of how induced. At first glance the philosophy strikes one in either of two ways: As utterly absurd because of its extreme simplicity, or as perfectly reasonable because until modern times, and in each individual until school-age, the human eye is a constantly moving organ, whereas, modern civilization with its printed pages, arts and crafts and "machine production" *demands for the first time in animal history* constant fixation and relative motionlessness for continuous hours;[27] thereby depriving the human eye of its inalienable right—*the constant motion for which it is ideally constructed and muscled.*

Stasis being the one extreme, and frenzied activity in modern traffic, the opposite extreme. The "Happy Medium"—the constantly roving gaze being the "Lost Art."

That certain, very favorable results, have frequently followed such methods cannot be intelligently denied, neither can it be successfully disputed that these methods fall far short of the ideal, and often fail in a manner inexplicable by the lay "enthusiasts."

The good results are readily and soundly explainable (although not by the "originators" of the several most widely advertised "systems," by considering that normal, full flexing of the extrinsic ocular muscles tends to release minor adhesions (if such have formed) stimulates normal lymph production, circulation and drainage, and normal circulation of blood; thereby tending to restore the orbital contents to normal physical and physiological well being.

The failures of such methods we believe are readily understood when one analyzes them sufficiently to discover *that ever such "lay"*

"system" requires that conscious thought must precede and direct the ocular movement, whereas in normal use our eyes move before we think, and even before we become *visually aware* of the object in space the light from which provides the exciting stimulus.

The sixth group ("Physiologic" Training) is a great step in advance of the previous groups in that it provides *some moving object for the eye to follow,* thus awakening direct ocular activity in a more natural manner. That is, the calisthenical movement is excited by a moving image upon the retina, involving the complete normal reflex arc from retinal stimulation to the brain and back to the muscles.

Methods included within this group have not been widely advocated, but have nevertheless been extensively employed and with commendable results. There are two reasons why such methods have been practiced clandestinely and shamefacedly: First, because the means employed were so ridiculously cheap or crude—a pencil, a retinoscope or ophthalmoscope light with the "head" removed, or some "home made" contraption. Secondly, because results were so little superior to the results of "systems" already adopted by charlatans that the more ethical man feared to face the ridicule and criticism awakened both by the equipment employed and by the inalienable human trait—particularly characteristic of the "professional" mind—to ridicule and decry anything new and near to his practice, especially if devoid of intricate details of complicated technique.

Results failed to surpass markedly those of similar methods because the technique lacked (a) confident introduction and application; (b) appropriate rather than impromptu appliances; and (c) *monotonous, mechanical rhythm.*

To accomplish the physiological results aimed for by all "vergence" building methods, perfect rhythm is—with few exceptions—absolutely essential.

Every army drill master and every specialist in physical training whose methods have met with success recognized the necessity for rhythm as evidenced by the universal employment of the musical accompaniment to physical training.

An ideal optometric technique of Oculo-Calisthenics should embody the best principles of everyone of the foregoing six; being a composite of them all, save the third (surgical methods). It should, however, go further and embrace means of determination (diagnosis) in addition to the regulation optometric examination for the purpose of refraction alone; so that Oculo-Calisthenics would not be recommended in the presence of conditions precluding satisfactory results.

In short, we believe the ideal technique designed to relieve ocular discomfort and to provide natural, normal orthophoria and physiologic function should include the following features:

(1) Means to disclose and demonstrate to the patient any abnormalities of ocular coordination.
(2) Means of discovering faults in the primitive functions of fixation and rotation, both monocular and binocular.
(3) Means of demonstrating the effect of "vergence" positions on binocular relations (both far and near).
(4) Means of qualifying and "grading" fusion.
(5) Means of measuring color, form, and motion perception fields.
(6) Means of measuring indirect visual acuity for comparison to direct acuity.
(7) Means of producing complete dissociation for both determinative and corrective procedure.
(8) Means of commanding attention of either eye, regardless of rate or time of alternation adopted by patient, and regardless of vergence position; and of commanding attention of both eyes when required.
(9) A great variety of conspicuous fixation targets, each of which may be moved at will into any desired position before the patient, leading the patient's eye, or eyes, through every possible movement.
(10) All movements of targets to be accomplished mechanically with a minimum of attention and mechanical knowledge on the part of the optometrist.
(11) A correct systematic procedure whereby Nature's plan of visual development can be carried through to the conclusion what we believe to be a natural way rather than the development of unnatural power to "offset" subnormal natural functions.

[The next chapter will deal with myology: setting forth what Shepard and Mendelsohn believe to be the beneficial results to be expected from proper calisthenical exercise of the ocular muscle.]—EDITOR—AMERICAN JOURNAL OF OPTOMETRY.

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NOTES ON THE THERAPEUTIC ACTION OF HEAT AS APPLIED TO THE EYE BY MEANS OF THE INFRA-RED RAY

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In using the infra-red rays from an ordinary Zoalite it was found when the eyes were not shielded that the majority of cases complained of an eye lassitude and a few of a distinct pain lasting a few hours after the treatment.

Now the infra-red rays aside from their possible local irritating effect are well known for their analgesic and sedative properties. They create an active hyperemia, the effect of which is the removal of toxins and of inflammatory or congestive pain. Quite often patients go to sleep when under treatment.

Regarding the action of the ray on the eye, it is questionable whether the ray itself or the heat it generates in the tissues is responsible for the eye malaise.

Muller in the Greafes Archives of Ophthalmology reports some experimental research on the action of infra-red rays on the eyes of guinea pigs. He observed numerous lesions caused by the infra-red rays. They are here given in order of their gravity: Temporary excitation of the sphincter with "restitutio ad integrum"; paresis of the sphyncter with turbicity of the aqueous; paralysis of the sphincter; persisting depigmentation of the iris, annular formation on the anterior surface of the crystalline lens.

The infra-red rays have this property of being invisible and of being transformed into heat when coming in contact with an absorbtive substance. It is possible that the ray itself may not have any effect, but that the heat generated therefrom may cause some changes in the processes.

This property of a temporary excitation of the sphincter may be an indication of the reason for the use of hot application before muscular treatment. If congestion is relieved by causing an active hyperemia, this may be another reason, but it is observed that such ap-

plication as well as the infra-red generated heat causes a short lasting edema which may interfere with easy vision and fusion.

Lacking the necessary instrumentation the effect of infra-red rays on the eye could not be observed objectively, undoubtedly there are some and the slit lamp should reveal them. Concurrently, there must be some effects due to heat applications and if carried sufficiently far so as to convect heat in the deeper tissues, a thing not easily done with convective heat, if not at all, changes might be observed, which would alter if not eliminate the indications for this procedure.

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A CRITIQUE ON THE PAPER, "THE INADVISABILITY OF OCCLUSION TREATMENTS," BY SAKS,[1] WITH FOUR ORIGINAL CASES BY THE AUTHOR

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While reading Dr. C. I. Saks' article on "The Inadvisability of Occlusion Treatments," it occurred that it is a serious thing to condemn anything that may cause relief from suffering. It should be done only after much careful consideration and the establishment beyond any possible doubt of sufficient reason.

Dr. Saks gives this unconditional advice: "Do not resort to Occlusion" in testing for Hyperphoria.

Now let us see the reasons he gives for his warning against the use of Occlusion.

Dr. Saks does not say whether he has used Occlusion, but says he "fails to understand just why this technique should be beneficial." He should have stated whether his warning is based on experience or abstract reasoning. Since my opinion of the efficacy of this test is based on experience, I feel free in advancing contrary opinions to his.

It is the province of this paper to consider Occlusion only as a method of making manifest latent Hyperphoria. Since the axis of the orbits are not parallel, but diverge, and the axis of each eye in a state of rest tends to conform to the axis of its orbit, as indicated by diplopia being concomitant with extreme drowsiness and inebriation even in a pair of eyes that are orthophoric normally. Occlusion does not give valuable information as to lateral phoric conditions. But as the axis of the orbits are in the same horizontal, or almost horizontal plane, the axis of the eyes are normally in the same horizontal plane. Therefore, I believe Occlusion is most valuable in making manifest, latent Hyperphoria.

Dr. Saks said in his article, "after taking so many years to build up this complicated ocular mechanism (adjustment of the extrinsic muscles to give single binocular vision) then why attempt to break up such a highly skilled function?" That line of reasoning is very similar to the following: After a pair of eyes has taken so many years to build up a spasm of accommodation, why attempt to break

up such a highly skilled function? Is not the later question as reasonable as the former? Cannot an extrinsic muscle develop a spasm as well as an intrinsic? It is true that they are made of different kinds of tissue, but there is more reason why an extrinsic muscle should cramp in a position to give single binocular vision than the ciliary should to give a clear image, because the mind has less tolerance for diplopia than for blurred vision. So if we admit the existence of latent Hyperopia we must also admit the possibility of latent phorias.

His question would indicate that Occlusion would cause a permanent loss of fusion. Perhaps it would in some cases if one eye were occluded for a considerable length of time, but experience has proven that if one eye is occluded for a few days (which is all that is usually needed to make manifest a latent Hyperphoria) no harm is done to the fusion sense. Occlusion of one eye for a few days does not break up this function.

He further stated that "the anatomical arrangement of the nerve fibres from the lateral nuclei (voluntary division of the third cranial nerve) to the internal, superior and inferior recti and inferior oblique will at once show why a vertical phoria will probably result from the breaking up of convergence and binocularity."

The above statement seems to mean that since the third cranial nerve supplies muscles that move the eye vertically as well as horizontally, Occlusion would naturally cause a false Hyperphoria. This reasoning does not seem clear to me. Just because the nerve that innervates muscles that move the eyes horizontally also innervates muscles that move the eyes vertically, it does not seem to follow that the occluded eye will turn up or down more or less than its fellow, unless there is a vertical anatomical imbalance between the two eyes in a state of rest, which is what we are looking for. If the axis of the orbits were not in the same horizontal (or almost horizontal plane—the plane of the orbits project forward at an angle of 15 to 20 degrees below the horizon) plane, then we would expect to find a false Hyperphoria to be caused by Occlusion, even as we expect to find a false Exophoria when one eye is occluded, because the axes of the orbits are not parallel, but diverge some 45 degrees. But the axes of the orbits are in the same almost horizontal plane, so in a state of rest any vertical variation of the axis of one eye from that of the other constitutes a real Hyperphoria.

Dr. Saks also said, "Suppression of one eye (Occlusion) teaches the occluded eye to forget how to see during time of stress." This might be true if the visual acuity of the occluded eye were much less than that of the other eye and if Occlusion were resorted to for any length of time, but since he also said he had "reference to cases only where the vision in each eye is about the same and where there is no existing tropia," the danger of causing Suspenopsia is practically nil. If there appears to be any danger of causing Suspenopsia by occlud-

ing one eye for a few days this danger can be averted by occluding the dominant eye instead of the nondominant.

In his article Dr. Saks digressed from his warning against Occlusion to discuss the correction of Hyperphoria. As stated above, it was not the original intention of this paper to consider the correction of Hyperphoria, but to try to show that Occlusion is a valuable test in finding Hyperphoria. However, a few words about the treatment of Hyperphoria will not be amiss.

He said, "Do not give vertical prisms in the position of rest in Hyperphoria. First, take care of the lateral muscles, which will generally take care of the Hyperphoria. When the Hyperphoria persists give a weak prism, about one half diopter, the apex towards the direction of least action." Before discussing the above it should be stated that I have never given a prism base up over a hyperphoric eye for constant wear, as is here advocated. I do not believe my patients would tolerate it. However, others claim to have done it successfully. I am not in a position to condemn this test because the condemnation would not be based on experience—our best teacher. To give a contra-indicated prism to be worn a short time daily seems more reasonable. This is not so drastic and is more likely to enlist the cooperation of the patient.

In regard to the statement "take care of the lateral muscles which will generally take care of the Hyperphoria," let me cite my own case. I have a lateral Orthophoria, practically, and normal lateral ductions and 1.5 prism diopters of Hyperphoria. My lateral muscles are already taken care of, so I cannot hope to get rid of my Hyperphoria in that way. My experience has been that Hyperphoria is just as liable to be found with horizontal Orthophoria and normal ductions as not.

Dr. Saks also said, "The vertical ductions are low enough without giving vertical prisms in the position of rest," and "we aim to give single binocular vision with the least amount of energy." These statements it seems to me are hard to reconcile. It would seem that less energy would be spent if the eyes were in the position of rest.

Permit me to cite a few cases where occlusion has manifested Hyperphoria.

Case One

My own case. Age 28. I have worn glasses for the past ten years, having been examined by some of the best refractionists in the country including the late Dr. A. J. Cross. My correction has varied from weak plus cylinders, their axis at 90°, to + 1.25 D. Sph. combined with weak plus cylinders. Up to about a year ago I had never really had comfortable vision. My phoria tests always showed an orthophoria and my ductions were normal. I noticed about this time that I was more comfortable when closing one eye. Virtual occlusion[2]

was resorted to by fogging the nondominant eye three spherical diopters. This was used for one week. A latent hyperphoria of 1½ degrees was revealed, which when corrected with prisms in position of rest gave complete comfort.

Case Two

Patient, female, age 49. Had considerable trouble with eyes for past seven or eight years. The refraction disclosed the need of the following correction:

O. U. + 1.25 D. Sph. ⊃ + 0.50 D. Cyl. axis 180.
Add, O. U. + 1.75 D. Sph.

No phorias either horizontal or vertical were apparent. The above was then prescribed, and used for three weeks when patient returned saying that while there was some relief, there was nevertheless some of the old discomfort still present. Not being able to improve on the correction, virtual occlusion was resorted to, this time a frosted lens being placed over the nondominant eye, in her case the left one. This was used for a week. At the end of this time the phoria test disclosed 3½ degrees of left hyperphoria at 20 feet and 2½ degrees at 13 inches. A 2½ diopter prism was added to her correction in the position of rest and has been since used with the greatest of comfort.

Case Three

Patient, boy, age 16. Routine examination disclosed about 2.50 diopters of hyperopia in each eye, one diopter of which was latent. He had a varying esophoria of medium amount, which I attributed to the latent hyperopia. No hyperphoria was apparent. I first prescribed a + 2.00 D. Sph., later changing this to O. U. + 2.50 D. Sph. Patient reported that his vision was intermittently blurred which was verified with trial lenses. At the same time he claimed that his eyes were not comfortable. An opaque lens worn over one eye for several days disclosed 4 degrees of hyperphoria at 20 feet and 3 degrees at 13 inches. 3 prism dioptres were corrected and patient has not returned since, though he is using the correction so I feel fairly safe in presuming that the prisms gave relief.

Case Four

Patient, female, age 36. Suffering from headaches. Examination disclosed nothing of interest but 1.50 diopters of hyperopia which was corrected. This gave some relief but not enough, and she returned. This examination disclosed ½ degree of right hyperphoria, while the previous phoria test had shown a perfect orthophoria. I then suspected that I might uncover still more hyperphoria so prescribed an opaque lens for the nondominant eye to be used a week. At the end of this period patient's tests disclosed 1½ degrees of right hyper-

phoria which when corrected gave her complete relief from her distressing headaches.

The purpose of my writing this critique is to defend the technique of monocular occlusion as a test for hyperphoria. We as optometrists can ill afford to discard any test without having overwhelming proof that the test is without value. I cannot agree with Dr. Saks in his contentions; in fact, on the contrary, my experience with occlusion has been fairly uniformly successful and I firmly believe that more thought and study should be applied to this form of diagnosis.

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A FEW NOTES ON "THE DECAY OF SIGHT IN OLD MEN" BY SIR ISAAC NEWTON FROM HIS MEMORABLE WORK ON "LIGHT" WRITTEN IN 1675, AND PUBLISHED IN THE YEAR 1704*

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Here are a few short paragraphs from Sir Isaac Newton's memorable work upon LIGHT, written by him **"Af part of the enfuing difcourfe upon Light written at the defire of fome Gentlemen of the Royal Society, in the Year 1675, and then sent to their Secretary and read at their Meetings, and the reft was added about Twelve Years after to complete the Theory * * *,"** the book itself being **"Published by Sam Smith and Benj. Walford, printers to the Royal Society, at the Prince's Arms in St. Paul's Churchyard in 1704"** can scarcely help being both interesting and highly instructive to practitioners of Optometry.

The chapter dealing with what we now know as Presbyopia runs as follows:

"Wherever the Rays which come from all the Points of any Object meet again in fo many Points after they have been made to converge by Reflection or Refraction, there they will make a Picture of the Object upon any white Body on which they fall."

"So if PR reprefent any Object without Doors, and AB be a Lens placed at a hole in a Window-shut of a dark Chamber, whereby the Rays that come from any Point Q of that Object are made to converge and meet again in the Point q; and if a Sheet of white Paper be held at q for the Light there to fall upon it: the Picture of that Object PR will appear upon the Paper in its proper Shape and Col-

*[This is the first of four papers inspired by the undoubtedly interesting perusal of Sir Isaac Newton's book, "LIGHT." In this paper and in the second, the author has been careful to reproduce the exact spelling and wording as used by Newton. In the third and fourth papers however the theories of and conclusions drawn by Newton will be reviewed by McFadden in his own language.] —EDITOR, AMERICAN JOURNAL OF OPTOMETRY.

ours. For as the Light which comes from the Point Q goes to the Point q, fo the Light which comes from other Points P and R of the Object, will go to fo many other correfponding Points p and r (as is manifeft by the fixth Axiom) fo that every Point of the Object fhall illuminate a correfponding Point of the Picture, and thereby make a

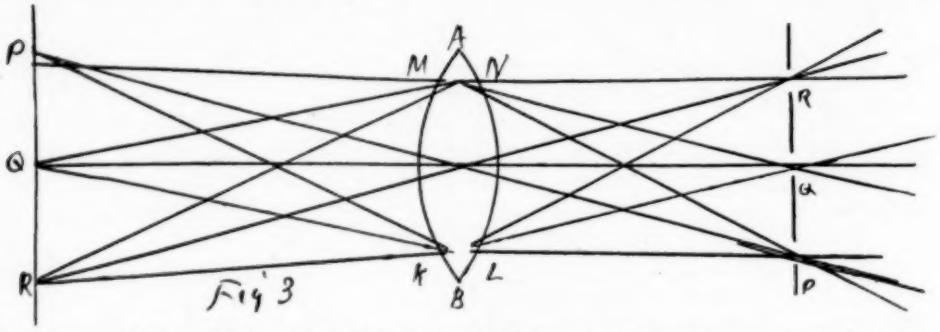

Fig 3

Picture of the Object in Shape and Colour, this only excepted that the Picture fhall be inverted. And this is the reafon of that Vulgar Experiment of cafting the Species of Objects from abroad upon a Wall or Sheet of white Paper in a dark room.

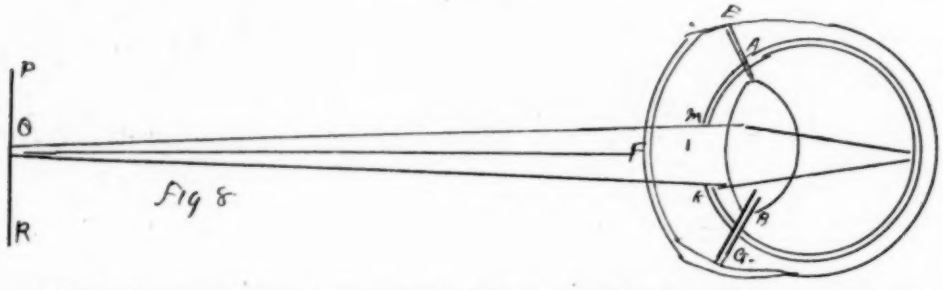

Fig 8

"In like manner when a Man views an Object PQR, the Light from which comes from feveral Points of the Object is fo refracted by the tranfparent skins and humours of the Eye (that is by the outward coat EFG called the Tunica Cornea, and by the cryftalline humor AB which is beyond the Pupil mk) as to converge and meet again at fo many Points in the bottom of the Eye, and there to paint the Picture of the Object upon that skin called the Tunica Retina, with which the bottom of the Eye is covered. For Anatomifts when they have taken off from the bottom of the Eye that outward and moft thick Coat called the Dura Mater, can then fee through the thinner Coats the Pictures of Objects lively painted thereon. And thefe Pictures propagated by Motion of the Fibres of the Optic Nerves into the Brain, are the caufe of Vifion. For according as thefe Pictures are perfect or imperfect, the Object is feen perfectly or imperfectly. If the Eye be tinged with any colour as in the difeafe of the Jaundife,

fo as to tinge the Pictures in the bottom of the Eye with that Colour, then all Objects appear tinged with the fame Colour. If any humours of the Eye by old Age decay, fo as by fhrinking to make the Cornea and the Coat of the Cryftalline humour grow flatter than before, the Light will not be refracted enough, and for want of a fufficient Refraction will not converge to the bottom of the Eye but to fome place beyond it, and by confequence paint in the bottom of the Eye a confufed Picture, and according to the indiftinctnefs of this Picture the Object will appear confufed. This is the reafon of the decay of Sight in old Men, and fews why their Sight is mended by Spectacles. For thofe Convex-glaffes fupply the defect of plumpnefs of the Eye, and by encreafing the Refraction make the Rays converge fooner fo as to convene diftinctly at the bottom of the Eye if the glafs have a due degree of convexity.

"And the contrary happens in fhort-fighted Men Whofe Eyes are too plump. For the Refraction being now too great, the Rays converge and convene in the Eyes before they come to the bottom; and therefore the Picture made in the bottom and the Vifion caufed thereby will not be diftinct, unlefs the Object be brought fo near the Eye as that the place where the converging Rays convene may be removed to the bottom, or that the plumpnefs of the Eye be taken off and the Refractions diminifhed by a Concave-glass of a due degree of Concavity, or laftly that by Age the Eye grow flatter till it come to a due Figure: For fhort-fighted men fee remote Objects beft in Old Age, and therefore they are accounted as having moft lafting Eyes."

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A ROUTINE OCULAR EXAMINATION FOR MOTOR DRIVERS

The following outline of a routine examination of the eyes of motor drivers is given with the idea of acquainting the profession with the optometric work which is being done on this subject. It has been reported[1] that eight states now require eye-tests for motor drivers, and it is sure that additional states will be added to this list from time to time. The subject and work is an important one which should engage the attention and study of members of all local Academies of Optometry, inasmuch as it is upon the shoulders of these men that work of this nature will naturally involve.

A modern examination of this character is carried on in the following manner, the various phases of the examination being made in this order:

(1) Name.
(2) Address.
(3) License Number.
(4) Date.
(5) Time of day that examination is made.
(6) Visual Acuity, Uncorrected, tests made monocularly.
  (6a) Acuity of Vision recorded in Snellen Notation.

(6b) Acuity of Vision recorded in Visual Efficiency.
(6c) Record of Chart Illumination at time tests were made.

(7) Visual Acuity, Corrected, tests made monocularly.
(7a) Acuity of Vision recorded in Snellen Notation.
(7b) Acuity of Vision recorded in Visual Efficiency.

(8) Record of Carriage of Head or other data of unusual character.

(9) Record of Color Perception.
(9a) Signal Lantern Tests for Red.
(9b) Signal Lantern Tests for Yellow.
(9c) Signal Lantern Tests for Green.

(10) Record of Field of Vision.
(10a) Record of Temporal Field of Right Eye.
(10b) Record of Nasal Field of Right Eye.
(10c) Record of total width of Field of Right Eye.
(10d) Record of Temporal Field of Left Eye.
(10e) Record of Nasal Field of Left Eye.
(10f) Record of total width of Field of Left Eye.
(10g) Record of total width of Binocular Field.

(11) Tests for Versions, tests made monocularly.

(12) Tests for Diplopia.

I will now briefly review these twelve essentials of an examination for motor drivers, giving the technic followed in each case where necessary. Numbers (1) and (2), Name and Address. This information is obviously necessary where the records are made for the State, and the suggestion has been made[2] that the applicant be required to sign his or her own name to the card, thus eliminating the possibility of having one person substitute for another, as the signatures can easily be checked with the original signatures of the applicant made when applying for license.

Numbers (3), (4) and (5), License Number, Date, and Time of day that examination took place, are necessary as a routine matter of record.

Number (6), Visual Acuity, uncorrected, the tests being made monocularly. The applicant is first examined without his correction, should he wear one, in place. This test is made by having the applicant first read the test letters with the right eye and later read them with the left, the test chart placed at some known distance, preferably twenty feet. The monocular record of the applicant's acuity should be recorded both in Snellen and in Visual Efficiency. The latter system has been outlined in full by DuPlessis[3] and later by Sterling,[4] it having the advantage of being easily understood by layman.[5] At the same time a notation should be made regarding the character and intensity of the illuminant at the test chart.[6] This is easily done with a foot-candle meter and assures all subsequent tests being made

under similar conditions should a dispute arise as to the correctness of the findings.

Number (7), Visual Acuity, corrected, the tests being made monocularly. If a patient uses a correction, it is now placed before his eyes and the Visual Acuity tests as made previously, Number (6), are repeated. The findings are again recorded, first with the right eye and later with the left. It is interesting in this connection to note the change which has taken place in the views of those most capable of correct judgment on the matter of what constitutes "safe vision" for motor drivers. In 1924 Davis[7] suggested that those whose vision was 20/40 Snellen or less, should be rejected. Mindt,[8] it seems still holds these views, but the majority of American Examiners[9] now believe that 20/70 Snellen is sufficient for the safe handling of motor cars, although Doane[10] seems to lean towards 20/60 Snellen, as a safer minimum.

Number (8), Record of Carriage of Head or other data of unusual character. While the acuity of vision tests are being made the examiner can be observing the applicant for any unusual physiological factors which would interfere with his or her vision. When noted, these are recorded.

Number (9), Color Perception Tests. This test should be made with a color lantern of some sort. Doane[11] suggests a simple slide with a red, green and yellow glass disc through which the rays light could pass. This slide slips through an illuminated box in the front of which is a 1-inch apperature. The applicant names the color as the slide is moved. A more refined test would be the use of the Edridge-Green Color Lantern of which Chase[12] says, "is the only apparatus with sufficiently broad and accurate application which can be used * * * to detect the greatest percentage of colored blind satisfactorily. The usual tests by worsteds alone eliminate only 50% of the color blind." This the writer can verify in his own practice, where he has had opportunity to compare the Jennings (a yarn test) with the lantern of Edridge-Green. The applicants to be rejected, in making a motorist's color test are: First, those who see three or less colors of the spectrum. Second, those who, while being able to perceive more than three colors, have the red end of the spectrum shortened to such a degree that their ability to distinguish this color is largely lacking, and, Third, those who are unable to distinguish between red and green light, red and white light, or between green and yellow light.[13]

Number (10), Record of the Field of Vision. In making a Visual Test for motorists, the survey must be made in as little time as possible and for this reason it is impractical in all cases to chart the limits of the form field of perception with a perimeter. A simpler method must be used, but still one which can be made to function with a fair degree of accuracy. Such a method exists and has been described in some detail by the writer.[14] The method of procedure

is as follows: The applicant is first seated comfortably. The room is well illuminated. The examiner next seats himself directly in front of the applicant and at about an arm's length away. Assuming that the examiner wished to determine the approximate extent of the indirect form field of the right eye, he covers the applicant's left eye with his (the examiner's) right hand, at the same time closing his own right eye. The applicant is then instructed to look with his right eye straight ahead into the open left eye of the examiner. The examiner then takes some small object—a pencil, for instance—and holds it in his left hand midway between himself and the applicant as far out to his left as possible. He then instructs the applicant to tell him the moment the moving pencil can be seen, as he draws it in towards him. At all times, I repeat, the applicant's direct line of vision must be straight ahead and fixed upon the left eye of the examiner, and the examiner must be looking straight into the right eye of the applicant. Now, if at the moment the objects becomes perceivable to the examiner the applicant also indicates that he is also aware of its presence, the external field of indirect form perception may be regarded as normal in this meridian. The examiner then proceeds to make this test over in various other meridians and then reverses the procedure for the applicant's left eye. If the applicant's answers conform to the examiner's ability to see the test object, the applicant's form field may be regarded as normal. Any marked shrinkage in the size of the field in any of the various meridians tested immediately calls for a more thorough examination of the applicant's entire field, as it is easy to see that this test is, at best, quite crude and only suitable for roughly measuring the external limits of the form field.

As the outline of the routine examination for motorists indicates, we are interested chiefly in the horizontal fields, and the data recorded in degrees is as follows: Right Eye, temporal field, next the nasal field, and then the sum total of the two. This same procedure is followed with the left eye, and last the total of the two fields is placed on record. In this way a fairly accurate record of the patient's field is made and with a little practice the examiner will be able to carefully estimate within a few degrees the external limits of the form fields.

Number (11), Tests for Versions, the tests being made monocularly. The version tests, which are made to determine the presence or absence of a paralysis of one or more of the extrinsic muscles are simple to make and somewhat resemble the hand-test for taking the fields, and should be made immediately after the size of the field has been determined. The examiner (in making the version test) and applicant remain in the same positions as for taking the fields. If checking the version of the applicant's right eye, the examiner covers the applicant's left eye with his (the examiner's) right hand and requests the applicant to follow the test object with his right eye. The examiner, holding the test object in his left hand, then moves it

around in as large a circle as practical, at the same time observing the movements of the applicant's right eye as it follows the test object. The reverse of this is done with the left eye and the findings recorded monocularly as follows: Smooth and fast; smooth but slow; spasmodic but fast; spasmodic and slow. I recommend at this point that a rating system be introduced, numbering the findings in order, (1), (2), (3) and (4), and suggesting that patients rated either (3) spasmodic but fast, or (4) spasmodic and slow, be held for further investigation.

Number (12), tests for Diplopia. As we are examining applicants who are in many cases reluctant to admit their respective visual defects it is obvious that no form of questioning will, in these cases, produce results, as no one attempting to secure a driver's permit would willingly admit double-vision, as even the dullest person could easily perceive that diplopia would prove an insurmountable barrier to the coveted license. For this reason I am suggesting falling back upon tests for malingering,[15] choosing the following as one which I believe will prove both practical and sufficiently wide in its application and variable enough to eliminate all guesswork and still sufficiently simple in character as to enable the examiner to conduct the test in a very few moments.

The test is made as follows: Swing a phorometer in position before the applicant, instructing him at the same time to close his eyes. Then place the rotary prisms in such manner that an 8 degree prism base-up is before one eye. Now instruct the patient to view a light placed at twenty or more feet, asking him, at the same time, to tell just what he sees. If his answer is, "Two lights," instruct him to again close his eyes. Next rotate the rotary prisms so as to eliminate all prismatic power, yet still keeping the prisms themselves in position, and again ask him to open. Should he now say, "One light," it will be safe to pass the applicant. The test can of course be made a number of times to satisfy the examiner that the applicant is not merely guessing, but the test must be made with rotary prisms, as the trial case prisms are not accurate enough when placed in trial frames to make this test. The test can also be varied by starting the applicant off with no prism power before the eyes, this being followed by a test made through 8 to 10 degrees base-up or down as above outlined. The findings are simply recorded "Single-Binocular-Vision," or "Diplopia."

Suggestions have been made that a test for Suspenopsia be added to the above, the proponents claiming that such test could be made at the same time that the diplopia test is made. In this I do not agree, taking my position because of the fact that I do not believe a diagnosis of Suspenopsia can be made with the equipment at hand today, in a hurried manner as is necessary in making a routine test for motor drivers. In fact I do not believe such a diagnosis can be made, extreme cases excluded, in less time than is taken in making a routine

office refraction, with two or three post-refractions added. I do agree that the knowledge gained would be of great value in this work, but some quicker and surer method will have to be devised to make the diagnosis of Suspenopsia before the technic can be added to routine survey work of this kind.

C. C. K.

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ABSTRACTS

MYOPIA FROM THE POINT OF VIEW OF HEREDITY.

E. Holm. Acta Ophthalmologica. (French) p. 335. 1925-1926.

The author recalls recent research on the heredity of refractive errors. He criticizes Tscherning's dualist theory of an acquired

myopia and of an inherited myopia. According to the author, reading is only the more important factor bringing about the manifestation of hereditary myopia of small intensity. Departing from this theory he classes myopia into two main and one accessory groups:

1—Myopia directly due to the heredity of one or more structural abnormalities.

2—Myopia due to indirect hereditary factors, such as close work, etc.

3—Myopia due to other indirect hereditary factors than those mentioned in No. 2, such as juvenile glaucoma, hydrophtalmia, etc.

Holm also discusses genealogical trees of reported myopes and criticizes the conclusion of Jablonski and others stating that myopia is an hereditary affection of a recessive character.

His own observations on both low and high myopia seem to indicate that the direct transmission of myopia is twice as prevalent as the indirect, especially in intellectual families, while in the non-intellectual the direct and indirect transmissions are about equal.

In conclusion, he believes that reader's variety of myopia is due to a combination of factors following a certain dominant trait or mode. G. L. DuP.

VARIATIONS OF CORNEAL ASTIGMATISM WITH AGE. M. Monad. The Ophthalmological Society of Paris. Society Proceedings, May, 1927.

The author deduces from tests of a large number of patients of various ages, that astigmia evolutes with age from "with the rule" to "against the rule." His cases include young as well as elderly patients and the sum total of the astigmia was less in the elderly than in the younger subjects.

A member of the society reports the evolution of a case followed by first his father and then by himself over a period of forty years where the astigmia varied 60° in axis and diminished from five to two diopters in quantity. He compares this change to that happening in operated cataracteous cases. C. L. Du. P.

PECULIARITIES OF STRABISMIC VISION. E. Tron. Klin. Monat. Fur., Aug. p. 109.

In diverging strabismus and in monocular convergent strabismus there is a unilateral reduction of the visual field in the horizontal meridian. When the deviation is greater than 25° the restricted field is on the same side as the deviation; when less than 25°, it is on the opposite side. In alternating strabismus there is no reduction of the field according to the author.

Peripheral vision is better than central in strabismic amblyopia. The isopters are identical with those of the normal eye but smaller. The unilateral reduction of the visual field is an indication of an abnormal correspondence of the retinae and is a proof of amblyopia-exanopsia. G. L. Du. P.

ANNOTATIONS AND SOCIETY PROCEEDINGS

The American Journal of Optometry is the official Organ of the American Academy of Optometry, as well as the Organ of the Arkansas, Delaware, Iowa, Maryland, Michigan, Minnesota, Nebraska, North Dakota, Oklahoma, Pennsylvania and Vermont Optometric Associations.

The following gentlemen have consented to supply items of interest from their respective sections, acting in the capacity of

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SAVE YOUR SIGHT WEEK—?

The announcement is made by the A. O. A. that optometrists throughout America should participate in a Save-Your-Sight-Week, some time during April of this year. The idea, while not at all new, is fair enough, if followed through to its logical conclusion. However, from A. O. A. material which we have been able to gather on the subject, the proposal has been to date at least, merely this: We all should get together and celebrate a Save-Your-Sight-Week by mailing out a lot of pamphlets and by an increased use of individual "ethical advertising," the latter term, "ethical advertising," being one employed by Dr. Walter Kimball of St. Joseph, Missouri. It is distinctly his term, you understand, *not ours*. Dr. Kimball's remarks it may also be said on the subject of this "week" make little or no mention of Sight-Saving Clinics!

Now if I may be permitted to digress for a moment from the subject of Save-Your-Sight-Week, I would like to analyze this term so loosely used by former President Kimball—*"Ethical Advertising."* Now no one for a moment considers advertising anything but ethical for business men. But we do believe, and in this the public unquestionably concurs, that advertising is ethical *only* for business people and *not* for professional men. Optometrists can rant and rave as much as they wish about determining for themselves just how far THEY should go along this line and still be called ethical. Nevertheless it is true that as professional people we as optometrists are judged along the same broad grounds as are the members of all other professions, and optometrists who advertise are placed, in the sub-

conscious minds of the public, in the same class with the "Piles Cured Without the Knife" Medical Specialist and the "Painless Dentist."

These are the facts of the matter and as professional men we cannot escape them and such talk about "ethical advertising" is pure nonsense which denotes careless thinking of the worst possible kind, inasmuch as it comes from a man, high in optometric ranks, whose past honors place him in a position of influence, thus making this type of loose talk even more than ordinarily harmful. There is no such thing as individual "ethical" optometric advertising, despite the amount of lineage which is being run by optometrists who are doing so either because of a lack of understanding of the matter, or for the same motives as those which prompt the quacks of other professions to employ similar measures.

The time has arrived for optometrists, as professional people, to realize this cardinal principle of professional ethics!

Individual "ethical advertising" for professional men is a myth, a snare and a delusion, and its use only serves to lower its user in the estimation of the public at large.

Now to return to the Save-Your-Sight-Week. This in itself is a good idea, providing it is hooked up with something more tangible and serviceable than the mere sale of glasses. Something must be back of it of real public service and benefit. To merely put on the week and then fill the papers with eyeglass advertisements, many of which feature price, adds nothing to the prestige of optometry, nor to the well-being of the public.

In centers where the week is to be put on, a dignified announcement in paid space, should be made by the Optometric Association responsible. Collective advertising of this kind is ethical, providing the ad carries nothing which smacks of sales propaganda, and providing it offers the public a service which only a professional man is capable of giving. In this instance the announcement should be one regarding a Free Eye Clinic for the week, to be held at certain times, where any person could come and have his or her vision surveyed. Or perhaps it might announce a Free Motorists Visual Clinic, for the same purpose. Optometrists of the city could each serve a day or two in making these surveys only, and an immense amount of good would be done and good-will created to say nothing of the very favorable publicity which would be received.

Save-Your-Sight-Week, we reiterate, must be established on public service and go hand in hand with Free Visual Clinics—Not Advertising!

C. C. K.

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THE DISTINGUISHED SERVICE FOUNDATION OF OPTOMETRY

Dr. George S. Houghton, of Boston, Mass., announced last month the establishment of the Distinguished Service Foundation of Optometry. This Foundation is established to encourage original thought on the part

of optometrists throughout the world, and to particularly stimulate research along the following lines: Ocular School Hygiene, Illumination and Eye Safety. Original papers dealing with any of these subjects are to be submitted to a committee consisting of Drs. Howard C. Doane, A. O. Bruce and W. J. Driske, who will award gold medals and fellowships of the Foundation to the authors of papers considered worthy.

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SOUTHEASTERN CONGRESS OF OPTOMETRY

The Southeastern Congress of Optometry will be held in Tampa, Florida, May 7th to 11th. Dr. Ester M. Ingram, who is secretary of the Congress, writes that Dr. R. M. Peckham of Waterbury, Conn., will be the chief speaker and urges all Southern optometrists to attend. Dr. Ingram also advises that there will be several other speakers of note. The complete program will be printed in an early issue.

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EYESIGHT CONSERVATION COUNCIL OF AMERICA

Dr. Guy Henry, General Director of the Eyesight Conservation Council of America, announces that: "During the coming year, the Council will work with Better Business Clubs throughout the country to stamp out fraudulent traffic of concerns offering to fit glasses by mail. It is claimed that an offer to fit glasses by mail is a dishonest offering simply because it purports to do that which is impossible. Those who are being exploited by such tactics may suffer irreparable damage to their eyes." The Council has hit upon an important piece of work, and if successful in putting a stop to this type of practice, may consider the year 1928 well spent.

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NEW YORK STATE OPTOMETRIC CONVENTION

The officers of the Southwestern New York Optometric Society are very active making arrangements for the coming State Convention to be held in Jamestown, May 27th to 30th. This convention is to be held on the 20th Anniversary of the Signing of the Optometry Act of the State of New York. A heavy educational program is being planned; the lighter phases of convention life are being considered and a banquet at which some of the state's notables will speak, is being promised. All optometrists are invited and members of the New York State Optometric Society are particularly urged to plan to attend.

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NEW ENGLAND COUNCIL OF OPTOMETRISTS

The speakers and their subjects at the coming New England Council of Optometrists will be: "Optophosis, or Defective Vision Due to Defective Illumination," by J. L. Stair, vice-president National Illuminating Engineers' Society. "Ocular Symptoms of Constitutional Diseases," by Dr. A. O. Bruce. "The

Effect of Radiant Energy on Life," by Dr. Charles Sheard, Ph. D., physics section, Mayo Clinic. "The Brain in Relation to Vision," by A. Myerson, M. D., professor of Neurology and Neuropathology, Tufts College. "Elaboration on Accommodation and Convergence," by Charles Sheard, Ph. D. "Fundamental Principles of Psychology applied to Ocular Refractions," by L. J. Troland, Ph. D., Harvard College. Practical clinic demonstration with patient by Dr. Howard C. Doane, president, Massachusetts State Board of Registration in Optometry. Demonstration and discussion of the retinoscope and fusion, by A. S. Neumiller, M. D., Philadelphia. Demonstration and discussion on various measurements of muscles and application of same to individual cases, by Dr. T. F. Klein, dean Massachusetts School of Optometry. The meeting will be held at the Statler Hotel, Boston, Mass., March 12th to 14th.

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THE SKEFFINGTON GRADUATE CLINIC AT CLEVELAND

"Members of the Better Vision Society of Cleveland," writes Dr. R. W. Hall, its president, "have just completed their second year of the Graduate Clinical Course being conducted under the Five Year Graduate plan of Dr. A. M. Skeffington.

"The Society fostered the Clinic about a year ago and before it was undertaken this year, the members wished to have some information about the work to be given the second year. They did not want a recapitulation of last year's work, except as it was used for a foundation for further work. They wanted to be sure it was to be practical, and they wanted an idea of what was to be given.

"Dr. Skeffington stopped for a conference in December, and when it was learned that he was going into the vast field of true differential diagnosis color field work from the Optometric viewpoint, diagnosis, prognosis, and treatment of Strabismus, and all muscle work, in fact in other words, really going on into true graduate work and yet holding it always in proven practical fields. The Better Vision Society undertook to underwrite it, enroll the registrants, secured space at the Statler Hotel for holding the sessions, elected to work afternoons and evenings and prepare for a week of concentration and study. We had it.

"Here was spread before us OPTOMETRY. A comprehension of the diseases that, in their first manifestations, were a stumbling block to the Optometrist, and a complete study of their underlying causes, exactly to whom they should be referred to hold them in the sphere of Optometry and what should be done to them Optometrically.

"Then on into a world of differential diagnosis that swept away the last vestige of the outgrown and disproven ancient muscle theories that have disastrously held sway in Optometry for the last half century, and went forward into the newer, rational fields that fit in with known anatomy and brain functions. In Dr. Skeffington's

own phrase, here was indeed, 'No one man's theory. Here was the gathering of the fruits of the research of all Optometry.' We know from bitter experience that when one man comes forward with a theory worked out in his own office, he must invariably retreat from his advanced position as soon as the acid test of practical experience is applied.

"The other really great matter brought to the group was the application of campimetry to purely optometric problems. This is an entirely new phase of Optometric procedure and opens up a tremendous field for the diagnostic work of the Optometrist and strengthens his hold on the border line cases that have been a source of loss to Optometry and which have threatened the very life of the profession. There is not an Optometrist in the United States who can afford not to be placed in possession of this work. It is decidedly not available in print, nor does it seem possible to place it adequately in print.

"Had we obtained nothing else, had we spent the entire week on this, it would have been the most profitable week in our experience. But to this was added a study of muscle diagnosis and treatment that was complete and masterly, and a covering of strabismus that opened that field to rational handling. All in all, it was a Graduate Clinic of which Optometry may well be proud and whose value was beyond computation.

"To those men of recent graduation in Optometry, we say 'Do not miss this under any consideration. It is what internship is to the physician.' Some of us followed Dr. Skeffington to Canton, Ohio, for more of this work. Beyond doubt, Cleveland will be scheduled for the third year work, and in addition the extension work that follows the Clinic will hold together the group in year round study."

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EDUCATIONAL MEETING IN MICHIGAN

The Thirty-first Semi-annual Convention, writes DeGraff of the Michigan Society of Optometrists, was held February 21, 22, and 23 at the Hotel Pantlind in Grand Rapids. The mid-winter convention is primarily an educational meeting.

On Tuesday afternoon Dr. Ralph L. Dublin of Rochester gave a demonstration of the technic of routine ocular examination covering a simple refractive case. His work laid the foundation for Dr. Wiseman.

On Wednesday Dr. E. Wiseman of Buffalo spoke on "Neurological Developments in the Field of Ocular Imbalance." His lecture covered the development of the visual apparatus and followed it through to a practical application of this knowledge as linked up with the kratometer.

On Thursday morning Dr. Harold D. Judd of Detroit lectured on Pathology. His lecture was illustrated with stereopticon slides of actual photographs of pathological specimens. He also touched on the use of the perimeter and stereo-campimeter.

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(3) *Spartan Artshel 347H48*
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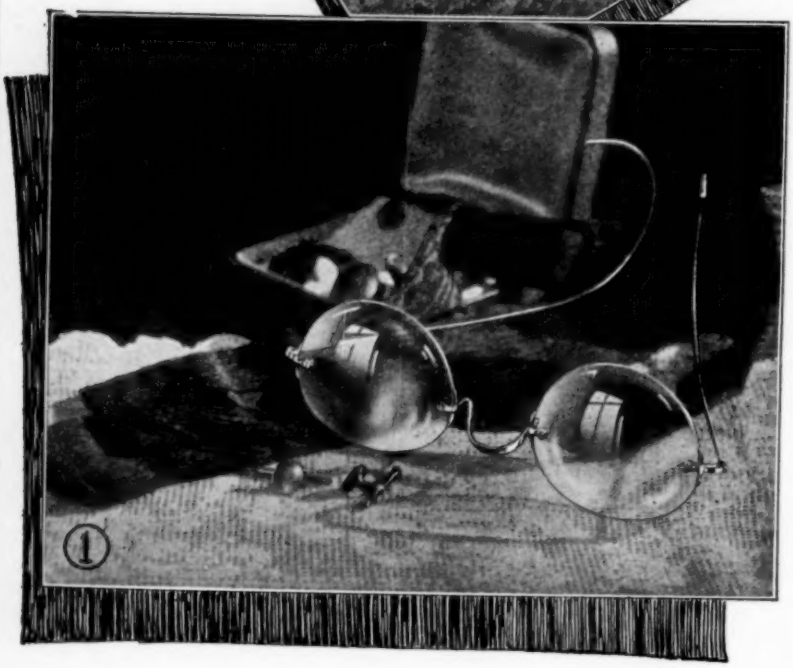

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